

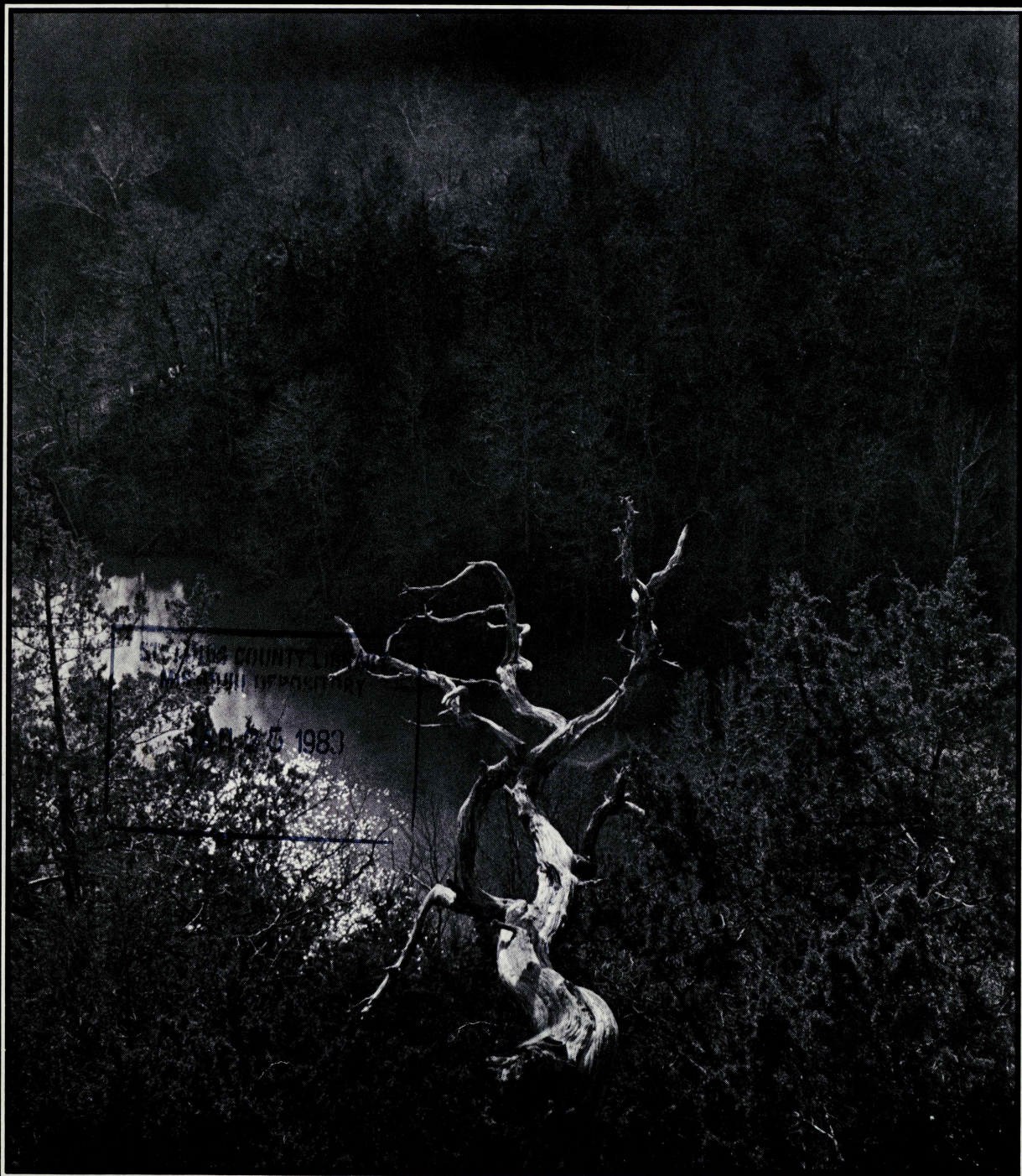
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M I S S O U R I

Resource Review

Annual Report

Fiscal Year 1982



Missouri Department of Natural Resources

EDITOR: *Debora Burgess*
ART DIRECTOR: *Dickson Stauffer*
WRITERS: *Debora Burgess, Nancy
Guyton, Sue Holst, Mary Still, Ed
Stroesser, Lois Thomas*
PHOTOGRAPHER: *Nick Decker*
*Photos are Nick Decker photos unless
otherwise noted.*
GRAPHIC PRODUCTION: *Coraleta
Alley*

M I S S O U R I

Resource ReviewE

ANNUAL REPORT Missouri Department of Natural Resources

Fiscal Year 1982

July 1, 1981 to June 30, 1982

Fred Lafser

Director

Ron Kucera

Deputy Director

Al Pasini

Director, Division of Energy

Robert Schreiber

Director, Division of
Environmental Quality

Dr. Wallace Howe

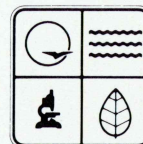
Director, Division of
Geology and Land Survey

John Karel

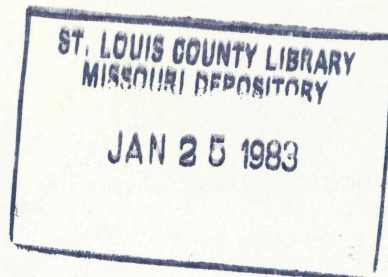
Director, Division of Parks
and Historic Preservation

Asim Khawaja

Director, Division of
Management Services



**Missouri Department
of Natural Resources**
P.O. Box 176
Jefferson City, MO 65102



JAN 31 '83





Striking a balance between the needs of the economy and the need to protect our natural resources was the key effort of the Department of Natural Resources in fiscal year 1982. The department weighed economic impact against the protection of our air, water, and land . . . against the wise use of our mineral and energy resources . . . and against the preservation of our natural and historical heritage.

"The Missouri Resource Review" highlights the progress the department made during the 1982 fiscal year in protecting our natural resources while, at the same time, supporting Missouri's economy.

DIVISION OF ENERGY

ENERGY CONSERVATION



As the price of gasoline has risen, more people have become part of their family budget: transportation. Mary Medley, Independence, found that her monthly commuting costs approached \$80. That was before she contacted the Kansas City Rideshare Center about the possibility of carpooling to work.

"My major reason for carpooling the last three years, of course, is saving money, which carpooling definitely does," Mrs. Medley explained. She and her husband now drive their car on the 45-mile round trip to work one week a month at a cost of approximately \$20. "We figure we save about \$60 a month by carpooling."

Besides the money-saving aspect of ridesharing, Mrs. Medley enjoys the convenience of parking in a "carpool lot" that is closer to her office than the general parking lot. "I personally have not experienced any inconvenience as a result of being in a carpool."

Carpooling is a common occurrence at the Department of Natural Resources.

***"We figure we
save about \$60
a month by car-
pooling."***

—Mary Medley

The Kansas City Rideshare Center has coordinated the formation of more than 1,500 carpools since the Division of Energy established it in 1978. Similar centers have been established in St. Louis, Springfield, and mid-Missouri.

Through the Division of Energy's rideshare program, Missourians have formed about 2,970 carpools. The dollar savings to commuters through these carpools is estimated at \$9.3 million annually.

Similarly, the rideshare centers have assisted in the formation of the 397 vanpools currently operating in Missouri. At current gasoline prices, these vanpools save Missourians \$3.4 million annually.

The money saved through ridesharing boosts the Missouri economy by reducing the flow of energy dollars from the state.

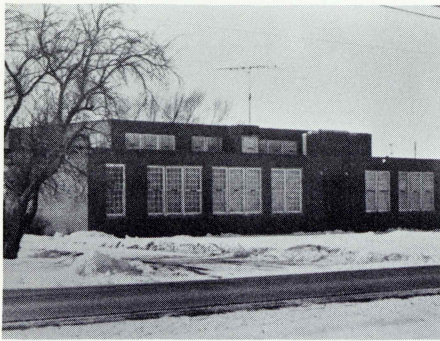
Ridesharing is one of the programs the Division of Energy offers Missourians to promote the efficient use of energy. Another program, geared to individual homeowners, is the infrared thermogram program. Through this program, "heat loss" pictures of homes and buildings have been provided to 45 cities. Project Conserve, a computerized home energy audit, offered 25,000 Missourians another program geared to individuals. The Division of Energy also weatherized 12,835 homes of low-income people.

Conservation programs offered to schools, hospitals, and government buildings in the state enabled 171 institutions of this type to receive conservation improvements such as insulation, storm windows, heating system renovation, and efficient lighting systems.

Also during the 1982 fiscal year, the Division of Energy expanded its Driver Energy Conservation Awareness Training to 54 agencies and organizations, and 105 individuals.

In the field of waste management, the division provided technical and monetary assistance to 45 Missouri communities to conserve the energy found in an ever-increasing resource—trash. During the 1982 fiscal year, 20 recycling centers were established or continued with the Division of Energy's help. In addition, five communities began recycling used motor oil. Another five communities conducted studies to determine the feasibility of producing energy through the burning of municipal waste.

MISSOURI SCHOOLS BENEFIT FROM CONSERVATION



Wakenda Consolidated School in southeastern Carroll County was informed in the fall of 1979 that its liquid petroleum gas consumption averaged 16,000 gallons yearly. A \$16,000 annual fuel bill did not seem far away, the school board reasoned.

The information on consumption came to light with an energy audit of the school. The Division of Energy provided auditor training and partial funding for the energy audit through its institutional conservation program. A network of auditors is in place throughout Missouri; more than 2,200 audits have been performed since 1979 on schools, hospitals, nursing homes and other public care buildings, and government buildings.

Wakenda Consolidated School did not stop with the energy audit. Working with the Division of Energy, the school received technical assistance concerning energy conservation measures it could take. "There was a whole lot we could have done to our building," Ed Castle, the school principal, explained, "but we selected the measures that would be most cost-effective."

Those measures included modification of the door and window areas of the school; reduction of air infiltration through caulking and weatherstripping; insulation of side walls; installation of attic insulation above the original flat roof and under a new hip roof; and the addition of a "solar wall" to provide space heat on sunny winter days.

Based on the Division of Energy's recommendations, the U. S. Department of Energy awarded \$26,276 to the school for completion of these conservation measures. This award was a portion of the total \$8.6 million in awards provided to Missouri schools and hos-

pitals for installing energy conservation measures.

To date, Wakenda Consolidated School has reduced its liquid petroleum gas consumption by more than 60 percent and could conceivably reach 75 percent savings as additional data on energy conservation projects are gathered. "We are optimistic that our calculated payback of 5.3 years will be correct," said Castle.

The project at Wakenda Consolidated School has become a community effort. Twenty-seven volunteers contributed the equivalent of \$4,000 worth of labor to insulate the attic of the school and three walls of the school, including the gymnasium. And, as a science project, the junior high school students have undertaken the task of monitoring room temperatures in school, daily weather conditions, degree day readings, the hours of operation of circulating fans and the primary boiler, and the number of gallons of liquid petroleum consumed.

Many other Missouri schools have made similar progress through the institutional conservation program. Missouri schools participating in the program are saving \$1.5 million per year in fuel costs.

ENERGY RESOURCES

In 1981, real estate experts claimed that a buyer's market existed in the housing industry. That was one of the reasons Betty Steck, a home builder from St. Martins, attended one of the Division of Energy's Sun-Way home workshops. A Sun-Way home is a house designed to take advantage of energy from the sun.



Betty Steck used a Trombe wall, a passive solar heating device, to build energy efficiency into this St. Martin's home.

Mrs. Steck is confident that Sun-Way homes will sell in mid-Missouri. "The utility costs of a Sun-Way home are up to 50 percent lower than those of a conventional home. Other selling points are comfort due to the extra insulation and the extra light from the south windows."

The Steck home features standard Sun-Way criteria: maximum insulation (R-38 ceiling, R-20 walls and floor, and foundation insulation), passive solar design with windows located primarily on the south side of the home, double-pane windows and doors, and tight construction.

"The house with a low utility bill will be the one that sells," Mrs. Steck explained. She and a business associate, Wilbert Deeken of Jefferson City, have built a Sun-Way home in St. Martins. "We went with the solar home because we felt the public was aware of the energy shortage and is looking for a solution," she said. "We believe the time is right for this type of home."

"The house with a low utility bill will be the one that sells."

— Betty Steck

The Division of Energy has completed a pilot project promoting the Sun-Way home concept in mid-Missouri and now is promoting the concept statewide. In the 1982 fiscal year, 160 persons attended Sun-Way home workshops.

The Sun-Way home project is only one component of the Division of Energy's energy resources program. Other components are industrial conservation, wood energy, and solar energy.

Sixty Missouri industrial plants received energy audits in fiscal year 1982 through the industrial energy assistance program. The average energy cost savings per plant amounts to \$5,400 if the conservation measures recommended in the audit all are taken. Total savings would be \$324,000.

Two Missouri schools have begun to use wood to heat their facilities after receiving assistance from the Division of Energy. Houston R-I School expects to save \$30,000 a year with its new wood heating system; Northwest Missouri State University plans to save about \$100,000 annually.

The Division of Energy's solar section cooperated with vocational-technical high school classes in Missouri to construct 17 passive solar homes. In a similar effort, the division's staff directed the installation of solar water heating systems at seven Missouri scout camps. The solar section also held training sessions for 550 Missouri realtors and home builders concerning Sun-Way passive solar homes.

The Bottom Line:

Division of Energy

The 1982 fiscal year budget for the Division of Energy as compared to the 1982 fiscal year:

	FY 82	FY 81
Budget	\$9,610,873	\$14,756,128
Employees	48.10	56

DIVISION OF Environmental Quality



AIR POLLUTION CONTROL

...the same laws that are said to cause economic hardship have helped some Missourians to breathe easier.

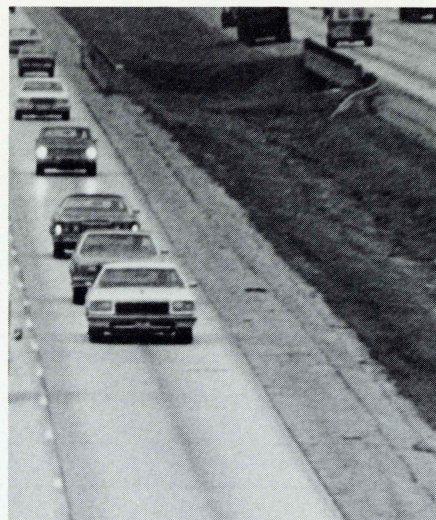
When a business or industrial operation is required to install pollution control equipment, there often is a cry of economic hardship. But sometimes the requirement is a "blessing in disguise."

One case in which pollution controls actually save money is at the University of Missouri in Columbia. Officials at the university were required to install equipment to control particulate emissions from its power plant stacks. Two taller stacks, with baghouses attached to trap the particulates, were in place by September 1981. And according to Mark Langford, director of facilities management at the university, those controls have turned out to be "good for the economy."

Langford said that the additions will allow the university to use cheaper, high-sulfur Missouri coal rather than coal brought in from Illinois. Since Missouri coal, at \$28 a ton, is less than half the price of Illinois coal, the university will save more than \$1 million a year in energy costs.

At that rate, the \$8.6 million price tag for installing the controls will be paid back in less than nine years.

In addition, the state also benefits from the university's controls. Every day the state highway department hauls away six or seven truckloads of the ash that is trapped in the baghouses to use on icy winter roads.



Aside from the economic benefits resulting from the installation of the controls, the environmental benefit of cleaner air is achieved. Clean air is one of the major aims of the Division of Environmental Quality. And though the national debate over pollution control continues in the reauthorization of the federal Clean Air Act, the same laws that are said to cause economic hardship have helped some Missourians to breathe easier.

In fiscal year 1982, Missouri's air pollution control program reported a major reduction of air pollution levels in the state's two nonattainment areas: St. Louis and Kansas City. According to an August 1981 report, significant reductions were made in the emissions of volatile organic compounds, particulates, carbon monoxide, and ozone in both areas. In addition, the sulfur dioxide standard was attained in the St. Louis metropolitan area.

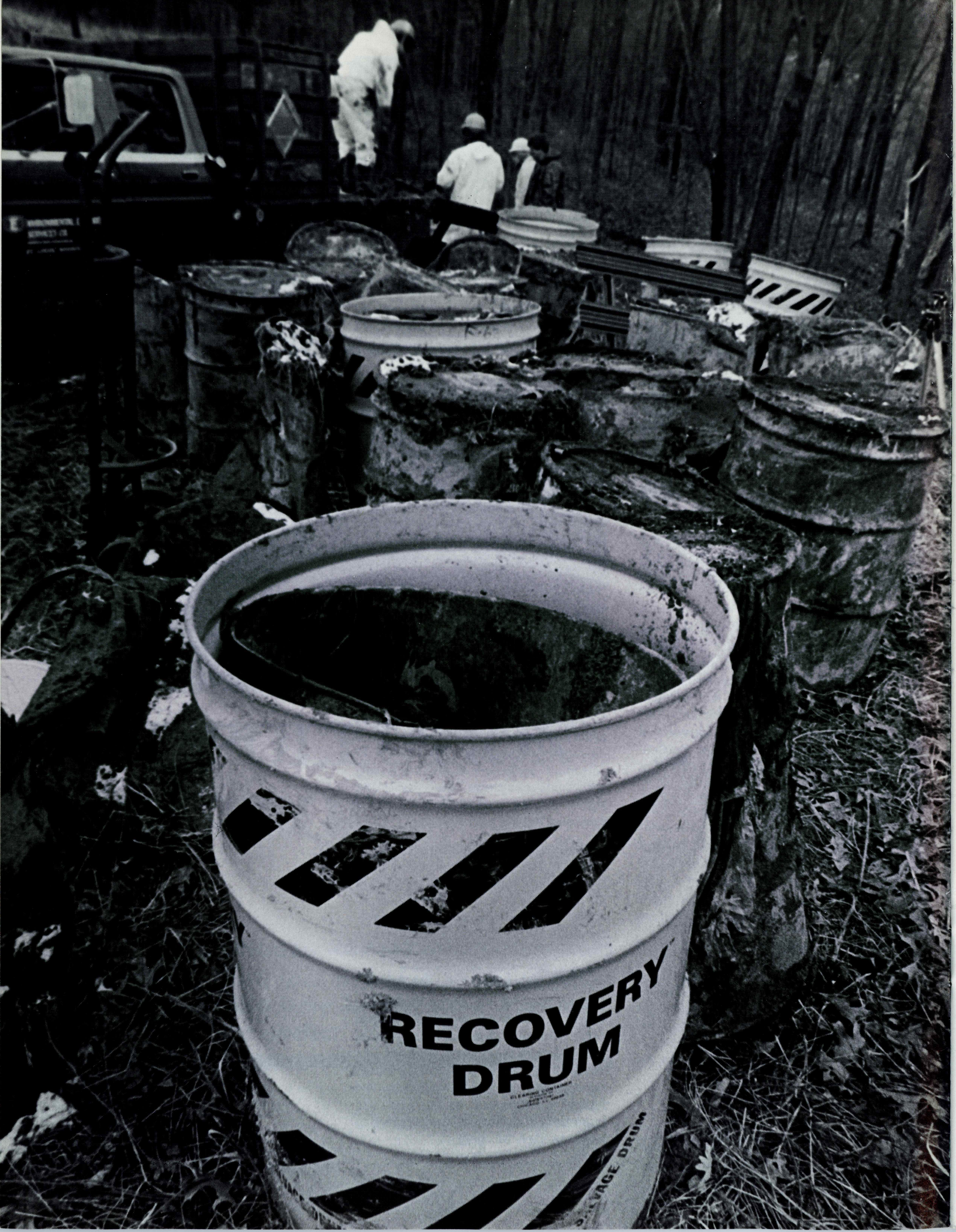
All told, state air pollution control officials report that 2¾ million tons of pollutants were released into the air by more than 300 major sources and more than 2,000 minor sources of pollutants in the state.

Air pollution control program personnel inspected 240 of these major sources and 309 of the minor sources in fiscal year 1982. Two sources found to be continually violating the state's air pollution rules were referred to the state Attorney General for litigation.

Also during the year, the Air Conservation Commission and its staff at the Department of Natural Resources worked to reduce the duplication of state and federal programs, and to study national issues dealing with future protection of air quality. The following actions were taken in the 1982 fiscal year:

- The air pollution control program took over the federal program designed to prevent deterioration of air quality in areas where air is now considered clean. Industries wishing to locate in "clean-air" areas now must comply only with state regulations. This reduces one significant duplication of effort by the state and federal governments.
- A voluntary program to reduce pollution from automobiles was started in St. Louis in fiscal year 1982. The program is an initial effort to bring the level of ozone down to the standards considered safe by the federal government. A more comprehensive draft plan for meeting the ozone standard in St. Louis was submitted to the U.S. Environmental Protection Agency by the Air Conservation Commission during fiscal year 1982. This plan outlines a mandatory inspection/maintenance program for automobiles in the five-county St. Louis metropolitan area, as required by the federal government. In the plan, the commission authorized the program to begin by Dec. 31, 1983.

- Concerning the issue of acid rain (also known as acid precipitation), the Air Conservation Commission recommended that the federal government conduct "additional accelerated research" to firmly identify the causes and effects of acid rain. Through the efforts of staff at the University of Missouri-Columbia, the air pollution control program also joined with the North Central Region of the State Agricultural Experiment Station to assess the effects of chemicals carried through the atmosphere and deposited in the rainfall. Two Missouri communities, Ashland and Poplar Bluff, were selected as sites for monitoring acid rain on agriculture, forests, rangelands, streams, and lakes.



**RECOVERY
DRUM**

RECLAIMING CORPORATION
1000 N. 10TH AVE.
SUITE 200
DENVER, CO 80202

RECOVERY DRUM

EMERGENCY RESPONSE

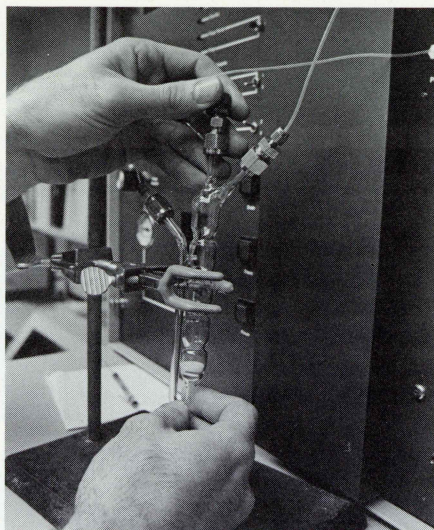
Approximately 30 cars in a 119-car freight train derailed in May 1982, sending toxic fumes over the small farming community of Callao and forcing evacuation of 150 residents. One car contained the toxic chemical acetaldehyde, which exploded into flames after the wreck.

For several months in 1981, drums of waste sat on the vacant lot in St. Louis where a condemned warehouse had been torn down around them. Officials could not agree on who should be responsible for disposing of the waste. Some of the drums contained paint sludges and solvents considered hazardous because of their flammable properties.

The Department of Natural Resources responded to both of these incidents. In the case of the Callao derailment, the department's environmental emergency response office supplied information about acetaldehyde to local fire officials, sent staff members to assist on the scene, and alerted other state agencies.

In the case of the drums in St. Louis, the department hired a contractor to remove the drums of waste when it learned that children were playing in the area. The dispute over responsibility, which apparently will not be resolved quickly, also led the department to take action.

Natural Resources' emergency response office is part of the laboratory services program within the Division of Environmental Quality. The office responds to all types of environmental emergencies: chemical spills or accidents that endanger water supplies or wastewater treatment facilities as well as abandoned hazardous waste dumps and similar situations that are hazardous but do not require immediate action. The office is staffed by individuals who have been trained in the use of reference materials, monitoring equipment, protective clothing, respiratory protection, and decontamination procedures. With the exception of one full-time emergency response coordinator, these staff members have other duties—monitoring of water, wastewater, and



landfills. The department also has three private companies on contract to respond to hazardous waste incidents if the responsible parties fail to act.

The emergency response office provides a 24-hour phone service so that people responsible for hazardous materials accidents or those trying to handle them can contact the department at any time for help. The staff member on duty has references on a large number of chemicals at his disposal, and can supply information about their properties, environmental and human health hazards, and emergency response procedures. The duty officer also has at least one response staff member available at all times to go to the scene of an emergency.

During the 1982 fiscal year, the department documented 442 hazardous materials spills and other environmental emergency accidents. Forty percent of the cases involved petroleum products while 52 percent involved chemicals. Eleven percent of the total incidents involved agricultural chemicals; five percent involved polychlorinated biphenyls (PCBs); and only one percent involved radioactive materials. Fifty-four percent of the incidents occurred at stationary facilities such as storage tanks; 13 percent were motor carrier accidents; six percent were rail accidents; three percent were pipeline leaks; and three percent were barge accidents. Twenty-one percent of the reports in-

volved improper disposal of hazardous waste and other miscellaneous accidents. More incidents were reported in April than any other month of fiscal year 1982.

As seen in the examples, the department's response to environmental emergencies varies depending on the circumstances. In most cases, the department cooperates with local, state, and federal agencies, as well as private industry, to minimize duplication and insure a proper response at the lowest cost. The department's response to a given incident might be to receive the accident report and refer the information to the appropriate agencies; or to provide the caller with advice on the properties of a hazardous material and proper cleanup procedures; or to refer the report to one of the department's six regional offices for further investigation; or to send an emergency response staff member to the scene. In practice, most environmental emergencies are handled by the parties responsible; however, if the party is not known, or is unwilling or unable to respond correctly, the department can call on a contractor to handle the situation.

Emergency response personnel were involved in investigations at 10 abandoned hazardous waste dump sites during the 1982 fiscal year, and collected more than 2,000 samples for analyses in the course of these investigations. The staff was involved in three cleanup projects completed during the past year. In addition, the staff continued efforts to clean up three hazardous waste dumps, referred to as the Ellisville "site," that were included on the U.S. Environmental Protection Agency's national list of 115 top-priority hazardous waste sites targeted for action under Superfund (the federal cleanup program). More than 200 drums of hazardous waste were removed from one of the areas in fiscal year 1981. Work at this site continued into the 1982 fiscal year when the Department of Natural Resources and the Environmental Protection Agency removed 1,238 drums from the second dump site. As the 1982 fiscal year ended, an exploratory "geophysical survey" was under way at the third site.

LAND RECLAMATION

Lane Dally, a Vernon County farmer, values the land that makes his living. So he refused the first mining company that wanted to lease a portion of his land to strip the coal from underneath. "I figured they'd tear it up," he said.

Later, however, he changed his mind and leased 320 acres to a local coal-mining operation. The laws that now regulate land reclamation helped Dally to change his mind. Law now requires mining operators to restore the land they mine to a "usable as before" condition.

"If they put the rest of it back the way they have so far, I'll be pleased," said Dally. Dally has planted wheat on a portion of the land that the mining company has reclaimed and the mining company has terraced part of the area to prevent erosion.



Because of land reclamation laws, bonds for approximately 7,200 acres of reclaimed strip-mined land were released to active mining operations in fiscal year 1982. Reclamation efforts in Missouri are supervised by the state's Land Reclamation Commission and its staff in Natural Resources' land reclamation program.

Regulations governing the surface mining of coal make up a large part of the land reclamation staff's activities. Because coal creates acidic soil conditions, its mining waste can devastate the land like no other mineral. For this reason, it is important that land reclamation activities be performed in a manner that will return land to its prior condition. In its efforts to regulate surface mining, the land reclamation staff monitors each mining operation by performing periodic inspections and by reviewing applications for permits to mine.

Because coal creates acidic soil conditions, its mining waste can devastate the land like no other mineral. For this reason, it is important that land reclamation activities be performed in a manner that will return land to its prior condition.

At the end of the 1982 fiscal year, there were 17 active coal surface-mining operations in the state, covering more than 16,500 acres. Coal production in Missouri exceeded 4.9 million tons during 1982.

With the passage of Senate Bill 737, which established a coal mine land reclamation fund, the Land Reclamation Commission was given a means to reclaim newly abandoned land without causing undue financial hardship to mining operators. The plan, endorsed by the commission, requires all active mining companies to contribute a standard amount to the fund based on tons of coal sold. In addition, a \$500-per-acre bond is required from each company. The fund, in addition to the bond, provides the money necessary to cover reclamation expenses that may be incurred by the state if a company fails to complete its reclamation responsibilities.

Other land reclamation accomplishments during fiscal year 1982 include the following:

- Commission adoption of new rules, known as permanent program rules,



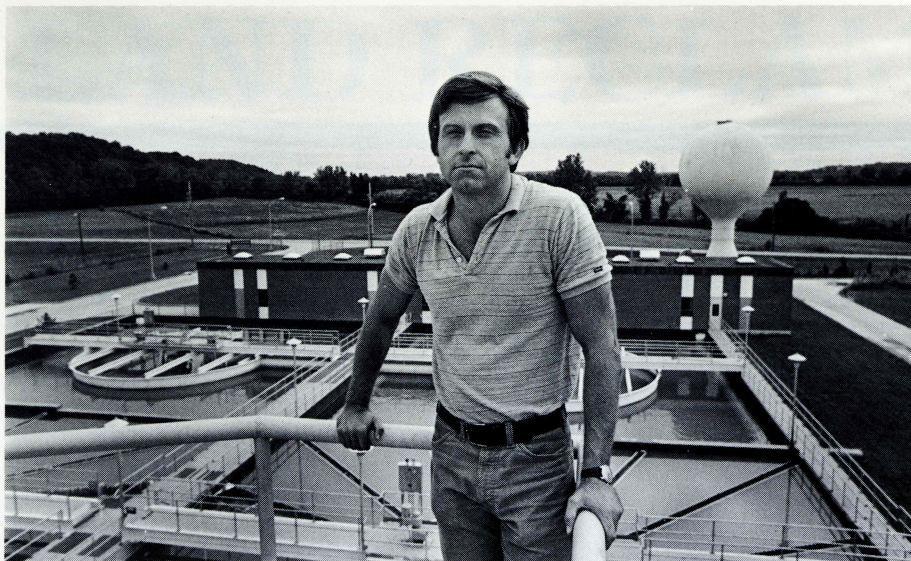
that call for broader public notice requirements when a prospective miner applies for a permit and when miners apply for bond releases after reclamation is complete. These provisions are designed to give the public more of an opportunity to comment on the performance of a mining company before and after mining, and to give the private citizen an idea of what to expect before an operation begins.

- Regulation of the mining of six other minerals in addition to coal. There are 11,000 acres of land that were actively mined for clay, sand and gravel, limestone, tar sands, and barite in fiscal year 1982. The commission's staff inspected each of these mining operations and has approved 1,500 acres of completed reclamation since 1972 when the first mining permits were issued.

- Beginning the Cedar Creek reclamation project, the first major land reclamation project being directed by the state of Missouri. The strip-mined land, located in Boone and Callaway counties, was mined for coal prior to the passage of laws requiring companies to reclaim mined land. It is now the responsibility of the state to monitor abandoned mined land and, when funding permits, to direct the reclamation of such land.

More than 67,000 acres of land in Missouri is considered to be abandoned mine land. Of that amount, approximately 8,127 acres are in need of reclamation because of threats to health and safety. The Cedar Creek project, Missouri's first major abandoned land project to receive funding from the federal government, is scheduled to begin construction shortly after the start of fiscal year 1983. Other abandoned land reclamation projects either scheduled or proposed include projects in Bates, Barton, Benton, Boone, Clark, Dade, Henry, Johnson, Randolph, St. Clair and Vernon counties.

This area in Callaway County will be reclaimed as part of the Cedar Creek abandoned mined land reclamation project.



"Most people don't think about the water they drink. It's simply there. And I think this speaks highly for all the communities that have been providing disease-free water for years."

— John Betz

PUBLIC DRINKING WATER

Drinking water is taken for granted. And John Betz, superintendent of the Columbia water treatment plant, thinks that's the way it should be.

"Most people don't think about the water they drink. It's simply there. And I think this speaks highly for all the communities that have been providing disease-free water for years," Betz said.

The water pumped into Columbia's plant from wells in the sand and gravel deposits adjacent to the Missouri River is a hard water with a high iron content. To make this water safe for Columbians to drink, Betz and the other 15-20 people employed at the plant remove the iron, soften the water with lime, and add fluoride and chlorine. This treatment can be applied to as much as 16 million gallons of water each day at Columbia's plant, although the average is seven to eight million gallons.

In addition to treating the water, Columbia supplements the Department of Natural Resources' sampling program by monitoring water samples several times each shift.

According to Betz, the treatment and the monitoring all go to achieve one end: "We're interested in turning out a first-rate water to our customers every day."



Rick Anderson Photo

The Department of Natural Resources also is committed to turning out first-rate water to Missourians. As part of its efforts to this end, the department's public drinking water program began a water supply awareness campaign in fiscal year 1982. The "Water Watcher" reminds Missourians to become familiar with their water supply, and to take the precautions needed to prevent connections between water supplies and other sources of contamination such as pesticide sprayers. A cross-connection survey was made in this last fiscal year in an effort to reduce this threat of contamination.

Another key accomplishment in the 1982 fiscal year was an amendment to the state's drinking water regulations that requires certain public water supplies to monitor for trihalomethanes. Trihalomethanes are a class of chemical compounds thought to be cancer-causing at high concentrations. They can be found in drinking water when chlorine, added for disinfection, reacts with organic substances that are naturally present in water.

The Safe Drinking Water Advisory Committee, a committee composed of eight citizens, advised the Department of Natural Resources on the development of this regulation. This committee was established by the Missouri General Assembly to guide the department on the development of regulations.

In addition to beginning its water supply awareness campaign and amending its regulations, the public drinking water program continued with the routine tasks that also protect Missourians from unsafe drinking water. According to the program's data, 1,241 public water supplies were serving 92 percent of all Missourians by the end of fiscal year 1982.

One task of the public drinking water program is supervision of the design and construction of public water supplies, including the public water supplies at motels, hotels, restaurants, and other "non-community" supplies. During the 1982 fiscal year, the public drinking water program reviewed 178 engineering plans for new facilities. After the program was assured that construction projects had been completed satisfactorily, 70 permits to dispense water were issued.

To make sure water treatment facilities continue to treat drinking water adequately, the public drinking water program and the Division of Health cooperate with the water supplies to voluntarily monitor the quality of the treated water. This monitoring gives the state a chance to detect potential health problems early. In fiscal year 1982, 113,000 analyses were made. In addition, the public drinking water program certified 18 laboratories for conducting their own bacteriological or chemical analyses.

Another task of the public drinking water program is to inspect water supplies routinely throughout the year. The program made 441 inspections in the 1982 fiscal year to insure that the supplies comply with the state's drinking water requirements.

Yet another measure taken by the department to protect Missourians from unsafe drinking water is the on-the-job training and technical assistance offered to water treatment plant operators.



SOIL AND WATER CONSERVATION

“Erosion in the Dust Bowl was terribly visible. You can’t see what is happening in Missouri today ... but the accumulated effect is just as terrible.”

— Merle Doughty



Merle Doughty's “trashy” fields signify his commitment to protecting the soil for future generations.

Bob Harryman Photo

Not since the 1930s, when wind whipped away millions of tons of topsoil from the Dust Bowl, has soil erosion been as severe as it is now in Missouri, according to one farmer.

“Erosion in the Dust Bowl was terribly visible,” said Merle Doughty, a Livingston County farmer and president of the Missouri Association of Soil and Water Conservation Districts. “You can’t see what is happening in Missouri today because our soil just slowly slips away. But the accumulated effect is just as terrible.”

Erosion often is unnoticed in Missouri because rain, not wind, is the major cause of erosion here. Rain washes away an average of 12.2 tons of soil from each cropland acre in the state every year—the second highest erosion rate in the nation. But saving the soil is a great expense to the already financially strapped farmer, said Doughty. “The immediate benefit to farmers in controlling erosion is not very great. We have to meet the expenses for the year first—fuel, taxes, seed, fertilizer, and all the other expenses. These costs, along with any land payments and interest on the land, must be met before we are able to spend money on soil-conserving practices.”

Still, Doughty is a firm believer in saving the soil. And he thinks that financial assistance would tip the scales for many farmers.

In fiscal year 1982, the scales were tipped in Doughty's favor. More than a few people in the "right" places became aware of the seriousness of the erosion problem both in Missouri and in the nation as a whole.

In the autumn of 1981, the Midwestern Governor's Conference resolved to curb erosion in their states. In January 1982, Governor Christopher Bond recommended that the legislature appropriate \$1 million to the state's cost-share program, which was developed in 1978 but had never before received funding.

The cost-share program, developed by the state Soil and Water Districts Commission and its soil and water conservation program staff in Natural Resources, offers farmers that needed financial incentive to save the soil.

According to the program guidelines, the commission will allocate all cost-share funds each year through the state's 110 soil and water conservation districts. The district supervisors, who are better able to determine the soil conservation needs of their areas, will allocate funds to participating landowners after approving the landowners' plans for erosion control before the work has begun, and then, requesting reimbursement for the landowner's project after the work is completed.

The department received a promise of substantial additional funding for the state cost-share program in the 1982 fiscal year. Voters passed a \$600 million state revenue bond issue in June 1982. That bond issue proposal, which was developed primarily to fund capitol improvements in state government, will provide \$23.9 million for soil conservation over the next five years. The first installment of the money from the bond issue is scheduled to be appropriated during a late-summer 1982 session of the General Assembly.

With the promise of additional funding, the commission and its staff decided to test the effectiveness of the cost-share program. The department received \$200,000 from federal water quality management tax funds in February 1982 to conduct a demonstration project. The area selected for the demonstration was the Green Hills area of north-central Missouri, where erosion is severe. Through June 30, 1982, 180 landowners had been approved to receive funds through the program, and had applied, or were in the process of applying, the soil conservation practices.

Another success for the program and the commission in fiscal year 1982 was a demonstration project designed to illustrate the soil-saving farming technique known as conservation tillage. Conservation tillage involves leaving crop stubble and residue on the land after harvesting, foregoing the usual amount of tilling. The residue left behind covers the soil and protects it from rain and wind. By tilling less, the soil is not loosened and thus not easily washed away.

Soil and water conservation program personnel evaluated proposals submitted by 51 soil and water conservation districts that applied for participation in the project, and selected 20 counties to participate. Each participating district received \$500 grants to cover administrative costs.

Most of the 20 districts exceeded the minimum requirements of the project. But, more importantly, 26 additional districts—districts that did not receive any grant funds—also decided to participate.

Projects such as the conservation tillage education project show farmers what they can do to protect their valuable cropland against heavy rain. But when heavy rains turn into floods, a different set of precautions is necessary.

Starting in fiscal year 1982, the soil and water conservation program added another component to its responsibilities: flood plain management. The flood plain management section works with the Federal Emergency Management Agency and the National Flood Insurance Program to help Missourians protect themselves and their property from floods.

In the 1982 fiscal year, the Missouri flood plain management section joined with the three other states in the region to form a flood hazard mitigation team. The purpose of the team is to go to severely flooded areas in the region and offer assistance to federal, state, and local officials in the flood recovery process in planning measures to reduce future hazards.

To demonstrate to the public what can happen when a flood occurs, the flood plain management section made available a working model of a flood plain, complete with flowing river. The model illustrates the different precautions that can be taken to prevent or to ease the destruction of a flood.

Another area of the soil and water conservation program that is important to farmers and the general public is the soil survey section. In fiscal year 1982, four county soil surveys were completed and a total of 736,744 acres were mapped.

Missouri's cooperative soil survey effort is a good example of what can be accomplished through cooperation between the local, state, and federal levels of government. When the Department of Natural Resources began its soil survey acceleration effort in 1977, only 26 counties had complete, modern soil survey information. Now, six years later, 52 counties have access to information on crop productivity estimates, the suitability and potential yield of various crops on particular soils, the degree of soil erosivity, the feasibility of soils for septic tank filter fields, the bearing properties of soil types for construction purposes, and the suitability of soil types for reservoir construction and water retention. At the end of the 1982 fiscal year, approximately 51 percent of the state had been mapped.

WASTE MANAGEMENT



"We took a big step forward when we passed the state's solid waste law..."

—Carol Blohm

Carol Blohm and her husband Ed solve a big problem for their St. Louis area customers: what to do with the trash. Last year alone, they hauled off nearly 10,000 tons of trash to sanitary landfills for disposal.

Why is Mrs. Blohm in the trash business? "There's satisfaction," she said, "in providing a service everyone needs from birth to death."

When she and her husband started E & H Hauling Co. 17 years ago, Mrs. Blohm not only got into the business, she got involved in the industry. Working through various committees and organizations, she has become a spokesperson for her industry and its goals, eager to educate legislators and laymen about the special work and problems of solid waste managers.

Mrs. Blohm believes solid waste management practices in Missouri are improving. "We took a big step forward when we passed the state's solid waste law and replaced the old town dumps with regulated landfills," she said. Equally important was state and federal legislation that identified hazardous wastes, and placed them under separate and more stringent regulations. Those laws, she said, lifted a tremendous burden off the shoulders of the solid waste industry, which all too often had been forced to deal with carelessly managed hazardous waste.

This year, on the 10th anniversary of Missouri's solid waste management law, state officials took time to gauge the progress made since that law was passed and to examine the problems still to be solved. In 1972, Missourians were throwing away an estimated 4.2 million tons of trash annually at home

and on the job; today, that amount is an estimated 6 million tons. In 1972, waste was going to nearly 500 open dumps—foul-smelling places that harbored rats, polluted water supplies, and often burned out of control; today, those dumps have been replaced by a system of 125 engineered and regulated landfills.

State officials have found, however, that the very landfills that were the solution to the health-threatening and environmentally damaging practices of a decade ago, are no more popular than the old open dumps. Cities and private industries trying to site new landfills inevitably are faced with strong opposition from people who don't want a landfill for a neighbor, who are concerned about pollution of their streams and wells, and who think we ought to do something with our trash besides bury it. Although there is support for moving beyond landfilling, economics have kept the alternatives—recycling and burning trash to generate energy—on the drawing boards. Faced with these problems, state waste management officials have organized an ad hoc committee to review the solid waste law during the next fiscal year and suggest changes to better address the problems of the 1980s.

Despite the rather gloomy predictions for trash-to-energy projects, the state's first "community" resource recovery system began operating in March 1982 at Ft. Leonard Wood. The system is still being tested, but it will burn 50 tons of trash per day when fully operational, and generate steam to heat and cool the military complex. More than a dozen local governments in the state have studied or are investigating the trash-to-energy option. Also on a positive note, more than 30 recycling centers were operating in the state during the 1982 fiscal year, and 11 of these have weathered the economic ups and downs for more than 10 years.

In compliance with the state's solid waste law, 440 cities and several counties have prepared plans for managing their trash, and implemented them. State waste management officials have tried to help cities and counties develop these plans, focusing in recent years on areas without adequate disposal facilities and areas where landfills soon will be closed. However, these efforts to assist communities with solid waste planning, including those studying the resource recovery alternative, were cut drastically when federal support of state solid waste work ended in October 1981.

Despite the elimination of federal funds, the state has tried to strengthen its solid waste regulatory program and enforcement efforts. During the 1982 fiscal year, the waste management program issued 26 permits for solid waste facilities after reviewing the applications to be sure design and operating plans met state standards. At the request of developers, Division of Geology and Land Survey personnel evaluated nearly 70 sites to determine their suitability for land disposal prior to preparation of permit applications.

After these facilities are operating, department inspectors check them at least twice during the year to be sure they are being operated according to approved plans. These inspectors issued a total of 19 notices of violation to operators during fiscal year 1982. In 12 cases, the waste management program had to follow up with formal orders to comply. Five of the cases were referred for legal action, and one lawsuit was filed. Settlements were reached in six enforcement cases, bringing permitted facilities into compliance with the law in some cases, and forcing closure and cleanup of unpermitted, illegal dumps in others.

In September 1981, a task force completed a report for the General Assembly, shedding new light on hazardous waste management in Missouri. Based on a survey of the state's largest hazardous waste generators, the task force found that only a very small amount—as little as five percent—of the approximately 700,000 metric tons of hazardous waste generated each year in Missouri currently is being landfilled. The task force concluded that industry is changing its disposal practices in response to state and federal hazardous

waste regulations, and has the technical resources necessary to develop alternatives to land burial. The task force also reported that the bulk of Missouri's hazardous waste is being treated, incinerated, reused, or reclaimed. In addition, more than 70 percent of the waste is managed at facilities operated by companies at the plant sites where the waste is produced.

New regulations that spell out certification procedures and operating standards for hazardous waste recovery facilities were adopted last year by the Hazardous Waste Management Commission, the seven-member body that oversees the regulatory program. The standards must be met by the more than 30 facilities in the state that reuse hazardous waste, or process it to reclaim oils, acids, solvents, silver, and other metals.

The state regulates all aspects of hazardous waste management:

Generation. The waste management program has registered nearly 2,500 hazardous waste generators, including 1,300 waste oil generators.

Transportation. During the 1982 fiscal year, the department reviewed license applications and renewal requests for 250 hazardous waste transporters. Licenses of three out-of-state transporters were revoked during the year for failure to comply with insurance requirements. Through the state's manifest system, nearly 10,000 shipments of hazardous waste were "tracked" from the site of generation to a treatment, storage, or disposal facility. A manifest form, which identifies the waste, point of origin, transporter, and final destination, must accompany each shipment and it must be filed with the waste management program. State personnel reported only minor "paperwork" violations of the system during fiscal year 1982.

Treatment, Storage, and Disposal. According to state law, hazardous wastes can be processed or disposed of only at facilities that have state permits and meet state operating standards. When amended requirements took effect at the beginning of the 1982 fiscal year, the Hazardous Waste Management Commission notified the state's two existing commercial hazardous waste facilities to revise their permit applications accordingly by January. The depart-



ment is reviewing those applications and expects to announce preliminary decisions on the two permits in fiscal year 1983. The department also is reviewing an application from Missouri Industrial Environmental Services Inc. for a permit to construct a new hazardous waste facility in Macon County. A fourth application from Rickano Serv-



Inspection and enforcement are important aspects of the Missouri hazardous waste management program:

Inspection. To insure compliance with state and federal laws, 106 inspections were made at sites where wastes are generated; 62 inspections were made at sites where industries manage their own wastes; and 58 inspections were conducted at the two commercial hazardous waste facilities.

Enforcement. A suit filed by the department against a commercial treatment facility ended in payment of a \$25,000 out-of-court settlement by the company. In addition, the waste management program placed a Springfield firm under emergency orders to correct a potentially dangerous situation resulting from mismanagement of a waste management lagoon.

Also in the 1982 fiscal year, the waste management program, assisted by laboratory services and regional office personnel, was involved in investigation and cleanup of abandoned hazardous waste dump sites:

Investigations. Approximately 85 reports of illegal dumping were investigated. Nearly half of these are considered complete and should require no further action by the state.

Cleanup Projects. The state removed 250 barrels of hazardous waste from the site of an abandoned warehouse in St. Louis. It also began negotiations with those responsible to clean up five other sites. Efforts to clean up three hazardous waste dumps in west St. Louis County continued with removal of 1,238 drums of hazardous waste from one of the sites. The three dumps are referred to as the Ellisville "site," which is targeted for action under Superfund, the \$1.6 billion federal cleanup program. To date, more than \$200,000 in state funds and \$600,000 in federal funds have been committed to cleanup of the Ellisville site.

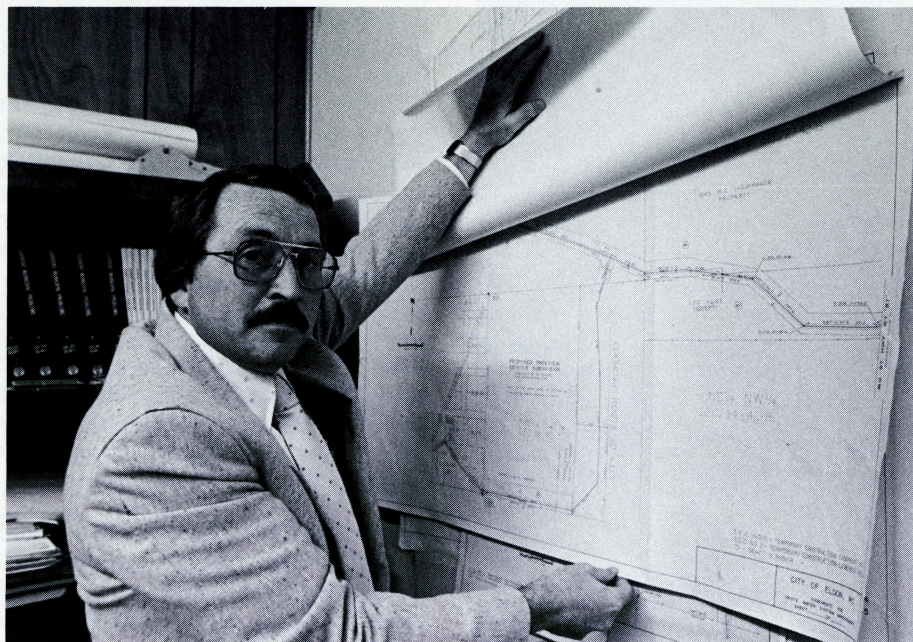
ices Inc. to open a new facility in Warren County was withdrawn by the applicant in June 1982.

With review of the four commercial facility permit applications nearly complete, the waste management program is starting to work with the U.S. Environmental Protection Agency to review

permit applications for Missouri's 150 "on-site" treatment, storage, and disposal facilities. In April 1981, 11 companies were notified to submit permit applications for their storage facilities in October. State officials estimate it will take at least three years to review applications for all existing on-site facilities.

Missouri's solid waste law has helped make town dumps like this one a thing of the past.

WATER POLLUTION CONTROL



Robert Millard looks forward to the day he can see more than plans of Eldon's new wastewater treatment facility.

Wastewater treatment in Eldon is "to the point of practical ineffectiveness," according to city administrator Robert Millard . . . but not for long.

"Our trickling filter treatment plant has been in operation 50 years and it was improved maybe 30 years ago," Millard said. "There isn't much difference right now between what's going into the plant and what's coming out."

Residents of Eldon, however, soon will have a treatment facility that does effectively treat wastewater before it is discharged to Blythe Creek. Millard reported that Eldon opened bids on a new wastewater treatment facility in October 1982. Construction will begin in the early spring of 1983 and continue for approximately one-and-a-half years.

The new facility, funded partly with a grant from the Department of Natural Resources, will be an oxidation ditch with the capability of treating one million gallons of wastewater a day.

"There will be complete treatment when the wastewater leaves this facility," said Millard. "This new plant will improve Blythe Creek from black water to a creek again."

Eldon's grant was the first administered by the Department of Natural Resources' water pollution control program in the 1982 fiscal year. The federal share of the grant will provide Eldon with 75 percent of the planning, design, and construction costs of the project; the state share, available as a result of the \$200 million bond issue authorized by Missouri voters in November 1980, will provide 15 percent.

Including the Eldon project, a total of 57 new projects were awarded construction funds totaling more than \$70 million in fiscal year 1982.

While money still is going out to communities for construction grant projects, there is less of it. Reduced federal funding led the Clean Water Commission, an advisory board appointed by the Governor, to adopt a new policy that limits the number of municipal facilities upgraded with construction grant funds. Communities with overloaded wastewater treatment systems now are ineligible for grants for new sewer extensions unless the communities agree to correct the overloading.

In recognition of the problems imposed by reduced funding, the Missouri General Assembly passed legislation that changes the law requiring federal grant funds to match state grant funds in the construction of wastewater treatment plants. Before this law was changed, some millions in state funds already set aside for construction grants would have had to sit idle while waiting for federal money. Beginning in the 1983 fiscal year, state funds will be available, if necessary, to help construct new wastewater treatment facilities with only local matches.

After the new wastewater treatment facilities are built according to plans and specifications approved by the Department of Natural Resources, the department regulates the pollutants entering the state's water through issuance of National Pollutant Discharge Elimination System (NPDES) permits to all facilities discharging wastewater. These permits set the wastewater treatment levels necessary to protect water quality. The department issued or reissued 500 NPDES permits in the 1982 fiscal year.

As part of the permit process, the Clean Water Commission ordered Union Electric Co. to conduct extra monitoring at the Callaway County nuclear generating plant. These monitoring requirements are in addition to those already mandated by the U. S. Nuclear Regulatory Commission.

Also in fiscal year 1982, Natural Resources continued its work on developing "pretreatment" programs in the state. These programs insure treatment of industrial discharges before they enter municipal wastewater collection and treatment systems. Industrial discharges can interfere with efficient plant operation if not adequately pretreated. City officials in 60 Missouri communities worked with their industries and the water pollution control program in the 1982 fiscal year on developing pretreatment programs.

Discharges and water samples from both municipal and industrial facilities are sampled regularly by the department's laboratory services program. In fiscal year 1982, 1,196 chemical and bacteriological analyses of wastewater effluent and water samples were conducted.

The discharge monitoring data and other information available from the laboratory services program helps the water pollution control program determine whether dischargers are in compliance with the state's regulations.

Of those not in compliance, many were located in one of five "priority water pollution control enforcement areas." The Department of Natural Resources identified St. Charles County, Jefferson County, Boone County, Taney County, and the Lake of the Ozarks area as the five priority areas. These areas were selected based on the number of violations in the area and on expected growth. Natural Resources outlined four steps that will be taken to resolve problems in these five areas: 1) increase technical assistance to those wastewater treatment facilities requesting assistance 2) set up more training courses for the operators of privately owned wastewater treatment works in the priority areas 3) focus additional resources and personnel on conducting more inspections and more closely monitoring the progress of non-complying facilities in the five areas and 4) take legal action both through the Missouri Attorney General's and the county prosecutors' offices as necessary.

In other enforcement action, the water pollution control program referred 12 cases to county prosecutors for litigation in fiscal year 1982 and two cases to the Attorney General's office. In addition, four cases were administratively transferred to the U. S. Environmental Protection Agency for enforcement action.

Also in the 1982 fiscal year, the Department of Natural Resources, St. Joe Minerals Corp., the Clean Water Commission, the Attorney General, the St. Francois County Environmental Corp., and the Department of Conservation all signed a formal agreement to clean up the Big River. Disaster struck the Big River in St. Francois County in 1977 when approximately 100,000 yards of tailings (waste ores often dumped in holding ponds) were swept away, clogging the river with sediment. A dam, built to retain the waste materials, had collapsed during heavy rains. After unsuccessful efforts elsewhere, state officials turned to St. Joe Minerals Corp., the owner of the land before St. Francois County Environmental Corp., and this company agreed to pay for the necessary repairs.

The Big River disaster is one example of "non-point" pollution, which is pollution not discharged from one particular point. Non-point pollution includes pollution caused by mining, agriculture, and other activities. In the 1982 fiscal year, the Department of Natural Resources continued with four major studies dealing with non-point pollution: 1) an inventory of all mined lands in Missouri 2) a study on the suitability of tailings as agricultural lime 3) a study of the Salt River basin that will indicate the effectiveness of soil conservation techniques as related to water quality and 4) a study of the Blue River that compares the contribution of non-point pollution with that of point pollution in a metropolitan area.

The Bottom Line:

The 1982 fiscal year budget for the Division of Environmental Quality as compared to the 1981 fiscal year:

	Budget	FY 82	FY 81
	Employees	\$12,008,881	\$27,044,698
		328.5	325.65

Division of Environmental Quality

DIVISION OF Geology and Land Survey

GEOLOGY

Before Vince Kovarik of Imperial begins to build a lake, he wants to make sure it will hold water. One of his first contacts for information on this subject is the Division of Geology and Land Survey in Rolla.

"Almost anything will hold water, but some areas are much more suitable than others," explained Kovarik, an engineer who has built several lakes in the St. Louis area. The suitability of the area depends on the geological characteristics and the underlying rock formations.

It is this basic information that is available from the division's engineering geology section. "I wouldn't dream of beginning a project without talking to them first," he said.

If he needs more information than already available to him, an engineering geologist will come to the site and give an appraisal of the area's geology. This may include drilling and taking core samples of the rock, and investigating the suitability of the soil and gravel for construction of an earthen dike.

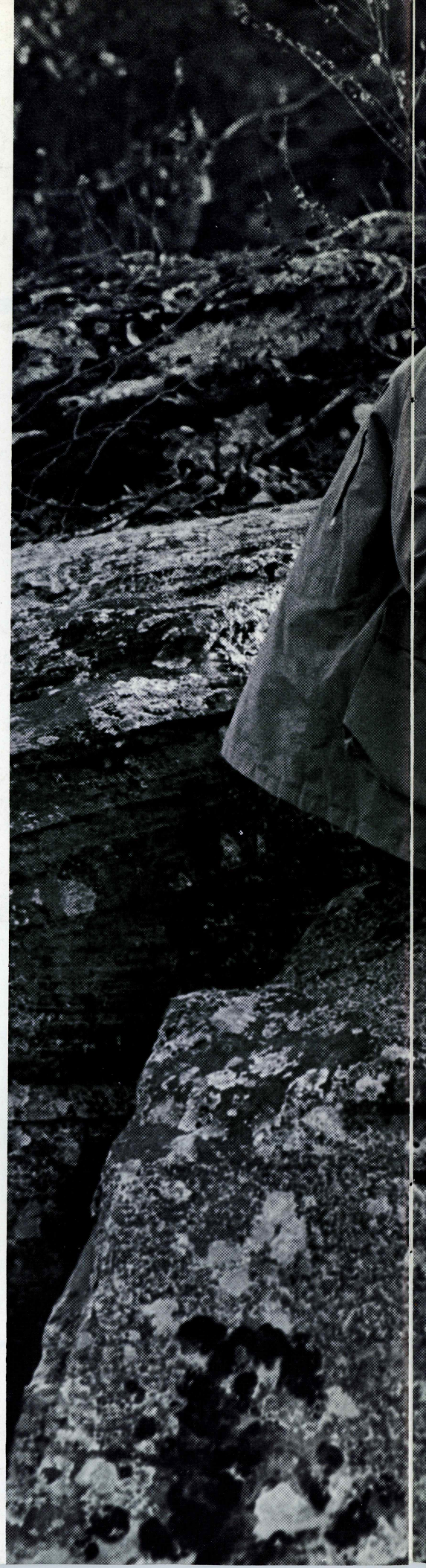
Kovarik praised not only the information available, but also the people: "They provide a service I couldn't supply

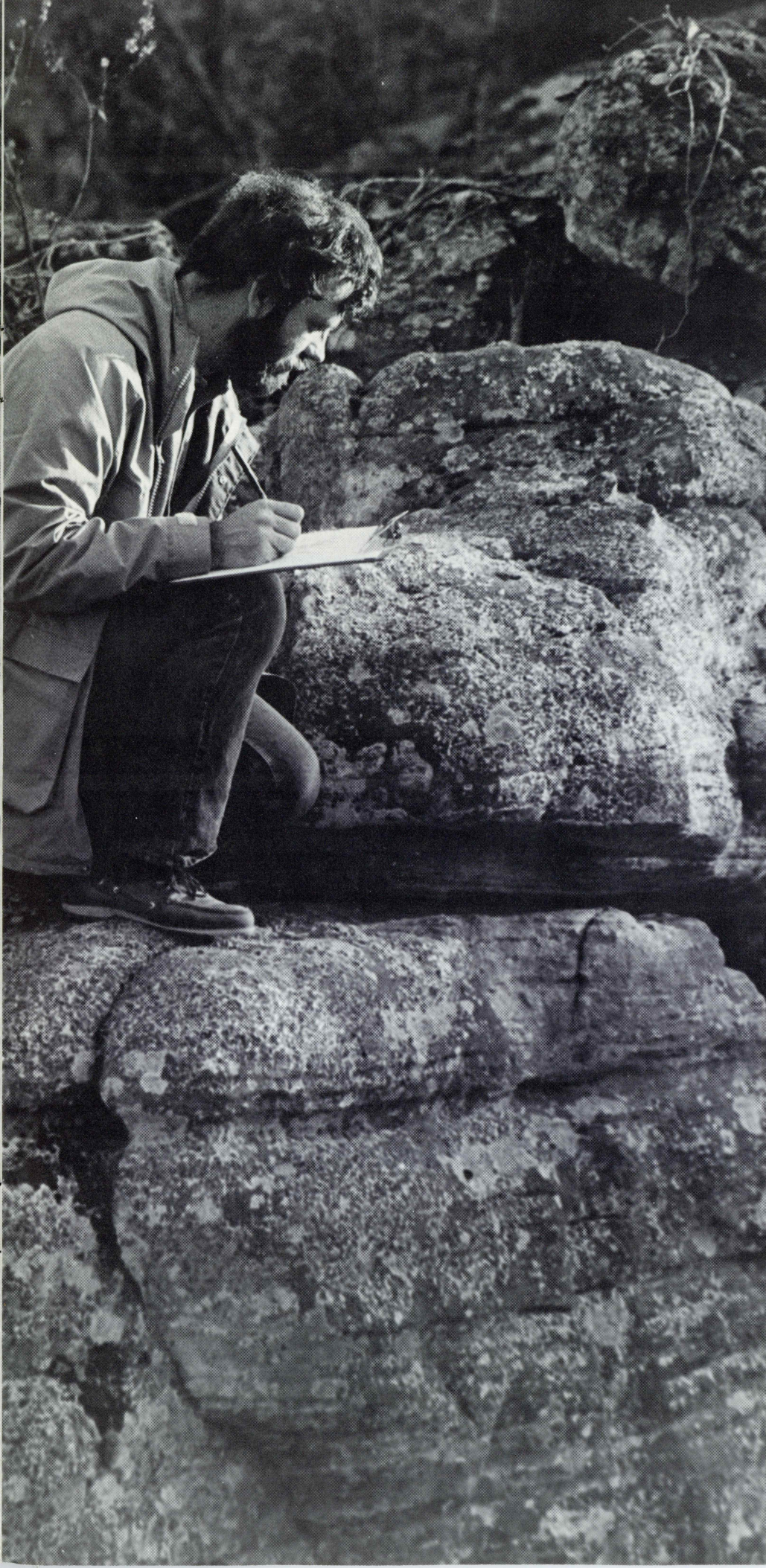
myself; you have to do it every day to be that good. They're probably the most dedicated and professional people I've run into."

Engineers, mining companies, geologists, and other state agencies are among the many who make use of the information and expertise of the Division of Geology and Land Survey's geological survey section. A continually growing resource of information and its use to help others represent the major accomplishments of the division during the 1982 fiscal year.

When a broken pipeline of liquid fertilizer caused contamination and extensive fish kills in Meramec Spring near St. James, geologists quickly traced the source of contamination, and worked with the pipeline company and other agencies to clean up the spill. They also helped locate the source of contamination when the toxic chemical dioxin was found in Spring River fish. In addition to assisting with numerous incidents involving hazardous chemicals and waste, geologists worked to prevent such problems by serving as technical advisors on the location and operation of waste disposal facilities. In fiscal year 1982, geologists evaluated the geology of 272 lagoon sites and 95 landfills.

Several industry-related studies were begun during the 1982 fiscal year. A





four-year study in the 7,000-square-mile Springfield Quadrangle will identify potential mineral resources, and set the stage for exploration and production by private industry. Another study will inventory the open shafts and other mine hazards in the zinc-lead district near Joplin. The study will make recommendations as to what should be done to eliminate remaining hazards and how the land should be reclaimed.

The public participated in several meetings held around the state to describe proper well construction and safeguards to be taken for reliable water supplies. Geologists continued to handle many citizen inquiries relating to siting and drilling of water wells.

Regulation of the U.S. Environmental Protection Agency's underground injection control program is being turned over to the Division of Geology and Land Survey. During the 1982 fiscal year, officials attempted to coordinate the Environmental Protection Agency's rules with those already established by the state concerning underground injection. Underground injection refers to the practice of injecting superheated steam into the ground to liquefy oil and make it producible.

The production of oil and mineral in Missouri also is monitored at the Division of Geology and Land Survey. Figures show oil production in the state increased substantially in 1981. More than 226,000 barrels of oil were produced in 1981 as compared with 130,000 in 1980. More than 500 permits for oil and gas wells were issued, and there were 457 producing wells in 1981.

While mineral production did drop in 1981, Missouri still produced 436,515 tons of lead, which represents almost 90 percent of the total lead produced in the nation. The total value of mineral production in the state was approximately \$1 billion; this compares with almost \$1.2 billion in 1980. More than a million tons of iron ore were produced in the state: 60,296 tons of zinc; 9,921 tons of copper; and 1,757,000 troy ounces of silver. Although coal production continued to drop during 1981, there was still almost 5 million tons of coal produced with a total value of nearly \$110 million.

Knowledge of geologic resources depends on gathering pertinent field data.

LAND SURVEY

"They saved me months of agony plus costly lawsuits."

— Clyde Looney



Clyde Looney learned the importance of having valid land surveys when he ran into problems selling his land.

When Clyde Looney of Farmington tried to sell 40 acres of his land, he ran into a problem not uncommon in the state. Because the original government corners no longer existed, a disagreement developed over the exact location of Looney's property line.

A survey requested by Looney showed that his property provided access to Straughn Road, a county road. Measurements based on a survey of an adjoining piece of property showed that Looney's land ended 40 feet from the road. Because of the conflicting surveys, Looney could not get clear title to the land although arrangements for its sale already had been made. Details of the sale were based on the survey that showed his land reached all the way to the road.

When no agreement could be reached on the conflicting surveys, Looney turned to the Division of Geology and Land Survey in Rolla. Following an investigation, a survey team restored the missing government corners. This gave local surveyors a common basis for the surveys and a common property line was established. The corrected survey showed Looney's land provided access to the road.

"I can't express in strong enough terms the real problem they saved us from," said Looney. "There's no telling how long this thing would have gone on; they saved me months of agony plus costly lawsuits.

The assistance given to Looney is only one example of services provided to the public by the land survey program during the 1982 fiscal year. Restoring original government corners, 97

percent of which have been destroyed, is one of the main goals of the land survey program. During fiscal year 1982, 265 corners were restored and 487 corners were re-established. The number of corners added to the inventory was 3,400. It has been estimated that the value of this effort to the public is more than \$600,000. In the course of restoration, the program settles boundary disputes, and saves the public time and money. Fifty-nine boundary disputes were settled in the 1982 fiscal year, with an estimated value to the public of \$49,200.

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The following accomplishments also were made in the 1982 fiscal year:

- The boundary survey for Fort Leonard Wood Military Reservation was completed. The Division of Geology and

Land Survey has been working with the Department of the Army and local private surveyors on this project for the last three years.

- The Division of Geology and Land Survey also worked with Natural Resources' Division of Parks and Historic Preservation to establish boundaries of state parks.

- Minimum standards for property boundary surveys were revised.

In addition to surveying, the land survey program maintains a record storage and retrieval system for all land surveys in the state. During the 1982 fiscal year, the land survey program completed microfilming all survey records in all the 110 counties that made records accessible. Records of all railroad rights-of-way also were microfilmed. A total of 69,037 land survey records were added to the files.

All these records now are included in a computerized repository network that can be reproduced for public use. During the 1982 fiscal year, this repository allowed the land survey program to answer 1,325 public inquiries for land records. The estimated value of this service to the public is \$46,400.

Also in fiscal year 1982, the Division of Geology and Land Survey completed its inventory of Missouri dams and, as a result, concluded that Missouri ranks fourth in the nation in the number of dams (3,331 dams). The inventory, submitted to the U.S. Army Corps of Engineers as part of the National Dam Safety Inspection and Inventory Program, was designed to locate all dams in the state that could pose potential threats to public safety.



Marked during the 1800s, witness trees are used today to help surveyors relocate original cornerstones.

The Bottom Line:

The 1982 fiscal year budget for the Division of Geology and Land Survey as compared to the 1981 fiscal year:

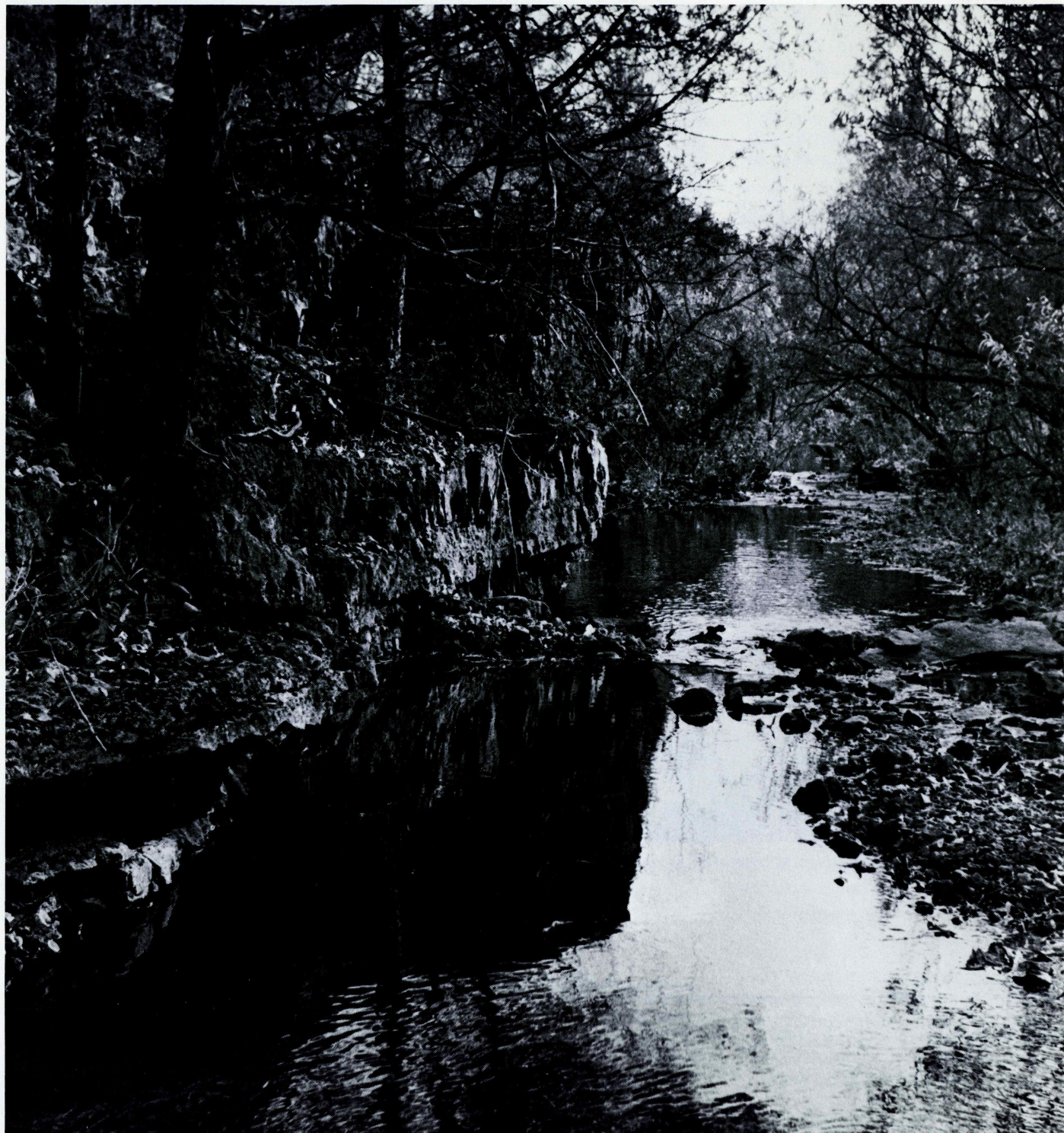
**Budget
Employees**

FY 82
\$2,240,719
107.27

Division of Geology and Land Survey

FY 81
\$2,384,238
111.10

Division of Parks and Historic Preservation



PARKS

When campers come to St. Francois State Park, they find a clean campground, a shady picnic area, and something more—a chance to learn about nature.

St. Francois State Park, located near Bonne Terre, is one of 12 state parks served by a full-time naturalist. Through the efforts of Ron Mullikin, the naturalist who serves both St. Francois and Hawn state parks, visitors can “learn firsthand about nature.”

Last year, Mullikin offered 66 nature interpretive programs in the parks, reaching more than 3,400 people. Subjects ranged from trees, astronomy, birdhouses, and wildflowers to playing nature bingo by identifying common animals in the park. Nature walks were held each Saturday and Sunday during the regular camping season; attendance ranged from two to 80. Mullikin said more than 1,000 people accompanied him on these walks through nature last year.

Although the majority of people Mullikin serves come to the park, he also takes his programs into the community. He has given 52 programs to civic groups and 101 presentations at schools.

Mullikin believes the popularity of the programs can be seen not only through the number participating (more than 10,000 altogether), but also by the fact that many campers return each year to participate.

Visitors to St. Francois and Hawn state parks represent only a percentage of the 9,655,760 people who visited Missouri state parks in the 1982 fiscal year. As both visitor and camper attendance increased for the year, park officials struggled to maintain the parks following a drastic reduction in federal funds.

A partial solution to the financial problem was found June 8 when voters approved a \$600 million statewide bond issue. The bond issue could make as much as \$58 million available to the division for capital improvements over a five-year period. This will allow the division to divert funds already allotted



Ron Mullikin

for capital improvements to operating costs. Emphasis will be placed on repair and reconstruction of existing facilities to make them more energy-efficient and to make operations more economical.

Also in fiscal year 1982, the park system acquired additional acreage following the disposal of lands from the Meramec Lake Project. Of the 27,000 acres of land the U.S. Army Corps of Engineers relinquished, federal legislation required that some of this acreage be managed by the state. Natural Resources will receive approximately 3,100 acres of this land, including an interpretive center, a number of caves and springs, and other historic resources. The land will be added to Meramec and Onondaga Cave state parks.

Two new state parks were dedicated during June 1982. Onondaga Cave State Park, which preserves one of the nation's most spectacular caves, was dedicated June 13. Prairie State Park, which preserves one of the best remaining examples of native tallgrass prairie in the state, was dedicated June 27.

The opening of these parks brings the total number of parks open to the public to 43, with 22 historic sites. There are two parks and three historic sites under development. The total acreage is state parks is 97,398. Additions to the system included Big Sugar Creek Wild Area at Cuivre River State Park and three new natural areas—Karst in Ha Ha Tonka State Park, Hanging Fen in Bennett Spring State Park, and Coakley Hollow Fen in Lake of the Ozarks State Park. These natural areas are designated to protect examples of the great variety of undisturbed natural communities and features found in Missouri.

In the spring of 1982, the traditional wildflower walks held in more than a dozen parks were expanded to include special information and educational programs and workshops. This spring, more than 480 people participated in the workshops, which will be held annually. More than 4,300 nature interpretive programs were given in the parks, reaching 105,030 people.

For people who can't take part in the naturalist-guided walks, self-guiding trail brochures are being developed for many of the park system's trails. During fiscal year 1982, work began on guides for Lake of the Ozarks Aquatic Trail, Coakley Hollow Trail at Ozark Caverns, and Big Oak Tree Boardwalk.

A major accomplishment in the development of the Ozark Trail was the Ozark Trail Council's adoption of its bylaws in September. The council, of which Natural Resources is chairman, was formed to oversee the development of Missouri's 500-mile portion of the trail. One hundred and thirty miles of the trail have been completed so far.

HISTORIC PRESERVATION

"Structurally these historic buildings cannot be reproduced today. But they can and should be made productive again."

— Robert DeBaca

Preservation of Missouri's past is paying off since passage of the Economic Recovery Tax Act of 1981. This act offers tax credits worth millions to private investors interested in restoring historic buildings for income-producing uses such as office buildings or apartments.

Robert DeBaca is one Missourian taking advantage of the act's incentives. These incentives enabled DeBaca to attract investors to a major project in downtown Carthage: the rehabilitation of the Meyers and Garland Building. This one-time hotel was built in 1892. Now, in 1983, the Garland Center houses a restaurant named after Carthage's famous outlaw, Belle Starr, and 16 other retail businesses. And it has contributed to the economic revitalization of the Carthage Courthouse Square.

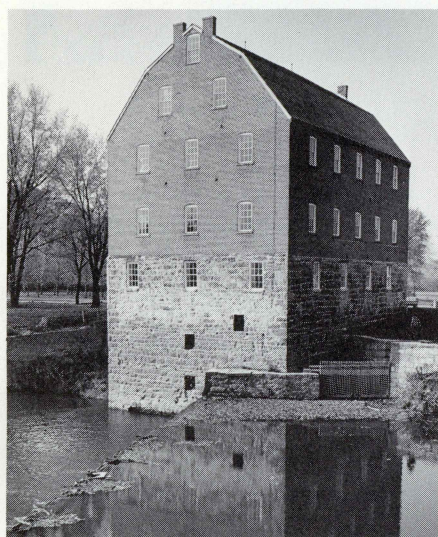
With the Garland Center, DeBaca has shown that historic buildings deserve another look. "If you really look at an old structure, you can see the beauty that the original architect envisioned," he said. "Structurally, these historic buildings cannot be reproduced today. But they can and should be made productive again."

Robert DeBaca, seated in the lobby of Carthage's Garland Center, has been instrumental in bringing new life to the Carthage square.



James Denny

DeBaca is not alone in seeing the potential of historic buildings in relation to the new tax act. The Department of Natural Resources, responsible for the state-level administration of this tax incentives program, received 127 applications for historic rehabilitation projects in the 1982 fiscal year. This statistic reflects a projected investment of more than \$264 million in the state for the restoration of historic structures. In addition to certifying tax credit applications, the department's Division of Parks and Historic Preservation works closely with owners, developers, and architects on these restoration projects.



As only qualified historic properties are eligible for the tax credits, a function closely related to the tax program is the nomination of historic buildings to the National Register of Historic Places. Missouri, at the end of fiscal year 1982, now has 521 sites on the register. An additional 60 sites, however, have been nominated by the all-new Advisory Council on Historic Preservation.

Many of the sites honored on the National Register of Historic Places came to light with Natural Resources' state-wide cultural resource inventory. So far, more than 50,000 archaeological, architectural, and historical sites are included on this inventory. Citizens and groups throughout the state have assisted the department with this survey. Many of these groups (including preservation organizations, regional planning commissions, and local governments) have received matching grants-in-aid through the federal Historic Preservation Fund monies, which are administered by the Division of Parks and Historic Preservation. In the 1982 fiscal year, the division administered \$739,798 in matching grants. These grants assisted in the preservation of 13 historic properties, the completion of more than 21 cultural

resource surveys, and the support of many local preservation organizations.

Some of the sites listed in the inventory are owned and maintained by the Department of Natural Resources as part of the state parks system. Missouri's 25 state historic sites include Harry Truman's and Mark Twain's birthplaces, covered bridges, and the First State Capitol in St. Charles. One state historic site, Bollinger Mill, was officially dedicated in fiscal year 1982. This important site, exhibiting both a covered bridge and a grist mill, is one of the few remaining in the United States.

The Division of Parks and Historic Preservation also administers a fund, created by the 1979 Historic Preservation Revolving Fund Act, that offers an alternative to state ownership for the preservation of historic buildings. This fund will be used to acquire threatened historic structures, renovate them, and then return them to private ownership or management. The restoration of one of Missouri's National Historic Landmarks, the house of ragtime musician Scott Joplin, is one such revolving fund project undertaken in the 1982 fiscal year.

The Bottom Line:

The 1982 fiscal year budget for the Division of Parks and Historic Preservation as compared to the 1981 fiscal year:

Budget Employees

FY 82

\$10,842,907
436.48

FY 81

\$14,878,101
514.25

Division of Parks and Historic Preservation

Division of Management Services

The work of the Department of Natural Resources, from providing recreational opportunities to the proper management of hazardous waste, would not be accomplished without the Division of Management Services. Some of the activities of this "behind-the-scenes" division include the management of the department's accounting system, and financial analysis of grants and contracts; the development of the department's \$36 million budget; personnel management of the department's 987 employees; analyzing and implementing appropriate computer resource systems; and management of the department's equipment, machines, and motor vehicles.

These activities are carried out through the following Division of Management Services programs: division administration and budget development; financial services; general support services; electronic data processing services; and personnel services.

During fiscal year 1982, the division also inherited the public affairs program. It is the goal of this program to keep the public informed of the department's eight regulatory commissions and advisory committees; provide information about 70 state parks and historic sites; keep the public informed about natural resource issues in Missouri; and help teachers increase their students' awareness of their environment.

The Bottom Line:

Division of Management Services

The 1982 fiscal year budget for the Division of Management Services as compared to the 1981 fiscal year:

	FY 82	FY 81
Budget	\$1,201,281	\$925,290
Employees	61.49	51.5

Office of the Director



"The wise use of our natural resources goes beyond environmental regulations. It also includes resource development."

Fred Lafser

The Department of Natural Resources' director manages the activities of the department's five divisions: Division of Energy, Division of Environmental Quality, Division of Geology and Land Survey, Division of Management Services, and Division of Parks and Historic Preservation. Responsible directly to the Governor, the director recommends policy on the protection of Missouri's natural resources.

Helping the director is the Office of Policy Research. This office assists the director in drafting and monitoring environmental legislation, and in researching major policy decisions.

The Bottom Line:

The 1982 fiscal year budget for the entire Department of Natural Resources, including the Office of the Director, as compared to the 1981 fiscal year:

Budget Employees

FY 82

\$36,075,029
987.79

FY 81

\$60,617,937
1083.53

Office of the Director

When environmentalists are calling him an industrialist and industrialists are calling him an environmentalist, Fred Lafser may very well be right on target. To Lafser, department director since 1978, both groups have a direct interest in the department's goals. "The wise use of our natural resources goes beyond environmental regulations. It also includes resource development," Lafser said. In fact, he predicts that resource development, together with the economy, will be the biggest challenges faced by the department in the years to come.

"Getting people back to work is the best thing we can do for the environment."

As for the current economy, Lafser said it's an issue with environmental consequences. "Right now, getting people back to work is the best thing we can do for the environment. If people aren't working, they don't have the luxury of being concerned about their quality of life."

"Each division in the department has an opportunity to influence the economy," Lafser said. As department director, he is always encouraging each division to take this opportunity to find ways to help stimulate the economy:

- **Division of Parks and Historic Preservation** — "This is the closest thing we have in state government to a tourism industry. We are going to need very active promotional campaigns to tell a new audience about our parks. And when we do this, I think we are going to see our parks gain national recognition." Lafser explained that the lure of the state parks should bring tourism dollars into the state. "But right now our resources - from our natural features to our historic sites - are hidden secrets."



- **Division of Energy** — The challenge in this division is conservation, Lafser said, pointing out that \$8 billion is spent on energy each year in Missouri. "Of this, \$7 billion goes right out of the state and into the economies of Texas, Oklahoma, and Saudi Arabia." The challenge, as Lafser sees it, is to keep that money in the state through conservation. "We are seeing a massive shift from our discretionary spending to energy spending. For example, next year you and I will spend \$400 more on energy costs. That is money that we might have spent in local restaurants, clothing stores, etc."

Lafser looks to the expansion of Title III efforts (money to pay for weatherization and other energy-saving techniques in public buildings) as a way the Division of Energy will be meeting the conservation challenge. "Weatherizing

schools will be an area where we'll be concentrating. This will benefit our schools and our economy," Lafser said, explaining that schools have more to spend on books and teachers' salaries when they spend less on fuel.

- **Division of Geology and Land Survey** — "Resource development is our key and we are in a position to pay more attention to it now," Lafser explained that it probably would have been a mistake to concentrate too heavily on resource development any earlier. "Until we have our environmental controls in place, it's difficult to advocate resource development." Through research and studies (such as the current resource study in the Springfield area), the department plans to have better knowledge of what mineral, oil, and gas resources are available. Dwindling resources combined with exploration tax credits make

exploration in Missouri more cost-effective. "The climate is now right for exploration. We must make Missouri as attractive as possible to industry while improving the quality of our environment," he said. Lafser added that future geological studies by the department may result in the exploration for oil and gas in northwestern Missouri and in the Bootheel.

● **Division of Environmental Quality** — While the Division of Geology and Land Survey is proposing exploration, this division is regulating such activities. Lafser does not see that as a problem. "While industry is concerned about our permit requirements, they are also interested in quick service. And with reduced budgets, that is really a challenge," he said. Another challenge in the area of environmental quality is increased enforcement of environmental regulations, Lafser said. "In general, industry is receptive to fair and equitable environmental controls. But if they meet our regulations, they are going to expect their competitors to meet the same regulations." Lafser explained that without good enforcement the "good" industries — the ones that meet environmental regulations — are the ones that are at a disadvantage.

With attention being focused on stimulating the economy and resource development, the question of environmental compromise is not unfamiliar to Lafser. "I don't see our department compromising as much as making realistic adjustments. This is only natural when environmental programs are finally being implemented," he responded. "The '60s were a time of public awareness about the environment and environmental problems. In the '70s, we had the birth of our environmental programs — the enactment of our laws. In the '80s, I think we are seeing adjustments that logically come when you implement the law. I think we can expect to see more of these adjustments," he said.

Lafser predicts the primary environmental concern of the '80s will be toxics. In fact, he'd like to see some of the current concern for dioxin contamination broadened to include concern for other contaminants in the environment. "Toxics are in the air and the drinking water. I don't think the attention on dioxin is bad; it's not that we are overreacting there, but I think we are underreacting to the toxics in our air and water."

To address this concern, Lafser suggests a broader monitoring program to include monitoring for chemical pollutants (federal law now requires monitoring for natural pollutants only) and better information concerning safe levels of pollutants.

For current department programs, activities and problems, Lafser has specific ideas:

● **Inspection/maintenance of automobiles** to control air pollution in St. Louis — "I really believe in this program, especially when it's integrated into the safety inspections already required by the Department of Revenue. It's a minor

there is a market." To Lafser, each "good news" announcement about grain exports means another ton of topsoil going down the river to New Orleans.

● **Parks and financial stability** — "I look for brighter times for parks if we change the parks system to reduce operating costs and if we pay more attention to concessions. Our goal over the next few years will be to recover 30 to 40 percent of the operating costs through earnings . . . without charging an admission fee," Lafser said. Parks currently recovers 20 percent of its operating costs through park concessions and camping fees.

"There aren't many states with parks, energy, minerals, and the environment in the same department. This is what makes our department strong."

effort and the virtues are enormous." Lafser estimated 100 million gallons of gas will be saved and one-half the air pollution in St. Louis eliminated. The program is scheduled to begin in December 1983.

● **Soil Erosion** — Lafser didn't dismiss the efforts toward increasing public awareness of this problem. Or the efforts to control erosion through reduced tillage and other conservation practices. His thoughts on the subject, however, are more along the lines of "long-term" solutions. "An overseas market for meat products is the one action we must demand if we are to solve this problem. One-half the land that is currently in row crops (producing grain) should be in pasture. As the situation is now, a farmer can save his topsoil by converting to pasture or he can save his farm by growing grain, a commodity for which

● As for the department as a whole, Lafser thinks its strength is in its structure. "There aren't many states with parks, energy, minerals, and the environment in the same department. This is what makes us strong. We can fight any battles 'in-house' and then work together as an agency — whether it be for conservation, resource development, recreation, land preservation, or environmental quality."

Employees of the Year



Nancy Masterson

Nancy Masterson is impatient. But, in the case of Ha Ha Tonka State Park, such impatience may very well be a virtue.

Masterson, who has been superintendent at the park since it opened in 1979, already has supervised the development of the park's trail system, construction of two trails for the handicapped, construction of several impressive overlooks, and development of the park's picnic area. Such a flurry of activities was one reason Masterson was recognized as the Department of Natural Resources' "Employee of the Year."

"Her initiative and resourcefulness have enabled her to make a valuable contribution to the parks system," director Fred Lafser said in presenting the award.

Masterson explains her accomplishment in modest, but direct, terms: "Basically, I just don't like to wait. If there's money to be used, I want us to have our share; if there's not ... well, that's the real challenge."

Lack of money doesn't often keep Masterson from getting the job done. For example, the park benches at Ha Ha

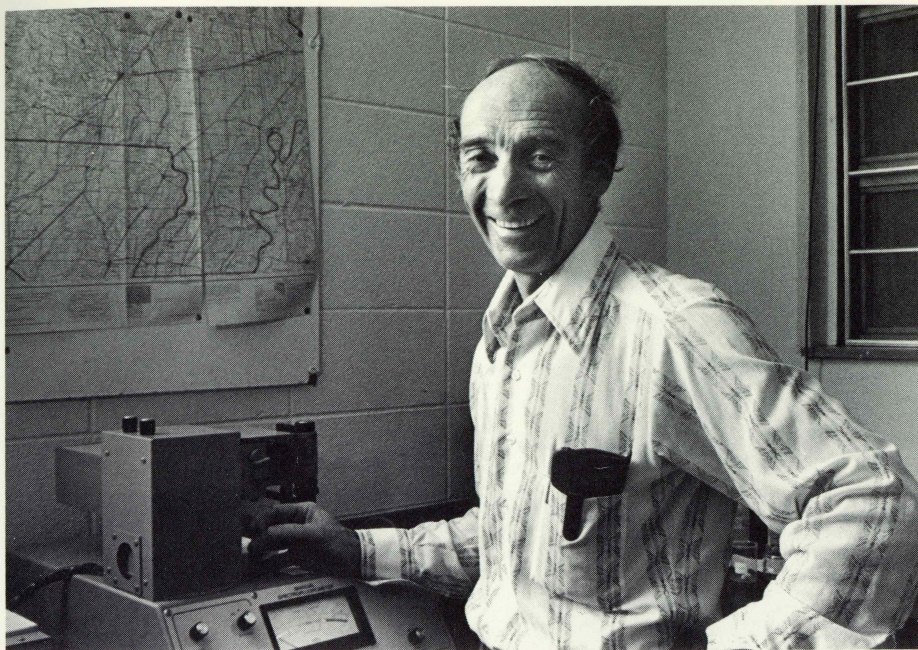
Tonka were castoffs from other parks. "We just scavenged around and found what we could use."

Another example is the visitors' center at the park. Or rather the lack of one. While a visitors' center would provide an ideal place to provide the public with interpretation of the park's natural features and the Ha Ha Tonka castle, not having one has not deterred Masterson's interpretive efforts. "People are hungry for information on this park. We've used our bulletin boards (for interpretive centers) and have practically turned our picnic shelter into a visitors' center by using the posts for bulletin boards."

Masterson began working with the parks system in 1974 in the Learn-to-Camp program, a summer program for first-time campers. At the time, she was working on her master's degree in recreation and teaching special education in the Columbia schools. Years later she left teaching to be a superintendent at Lake of the Ozarks State Park. "I left at the end of the school year in 1978. One morning I attended a faculty luncheon and that evening I began as a Superintendent I, working the Memorial Day weekend at Lake of the Ozarks State Park."

Her work with school groups visiting the park and the public relations involved in her current job are features of her job that are very similar to teaching. Other activities — such as pouring concrete, driving a ton-truck, using a chain-saw, and being outdoors — provided her with quite a change. "Being outdoors is naturally the biggest difference, especially being outdoors year-round," she said, adding that Ha Ha Tonka, like all Missouri state parks and historic sites, are open all year.

Masterson notes that often it's in the winter months that she really appreciates her work. "When I make my morning rounds through the park, I walk up to the overlook and look out at the winter morning. It sometimes simply amazes me that they pay me to work here," she says.



Dr. Jim Williams

The clear water that flows through Missouri streams is only part of the state's environment, but is a part that Dr. Jim Williams is dedicated to protecting.

Williams, chief engineer of the geology section at the Division of Geology and Land Survey, was recognized as one of the Department of Natural Resources' Employees of the Year in 1981. The award was presented for his outstanding efforts in the protection of Missouri's environment.

"Hundreds of Missourians have benefited from his knowledge of Missouri's geology," said department director Fred Lafser. "But perhaps his greatest contribution has been in his efforts to use his knowledge of geology to secure the proper siting of waste disposal facilities."

Williams said his section investigates 600 to 800 existing or proposed waste disposal sites each year, the majority for the Division of Environmental Quality. These investigations include gathering existing geological data and a field inspection. "The main purpose is to see if the site could cause surface or groundwater pollution," he explained.

Once the investigation is completed, Williams is involved in pointing out possible problems and how they might be alleviated. He also assists the Division of Environmental Quality in cleaning up problem sites.

Williams is proud of the cooperation between his section and the Division of Environmental Quality, the agency that regulates the sites. "We're the only state geological agency in the nation that participates this much in waste disposal sitings. If we didn't have this kind of cooperation, there would be an extreme case history of serious public health problems in this state," he said.

Williams also spoke about his staff with pride. "If it weren't for their dedication, we wouldn't be able to achieve everything we need to," he commented. He explained that, in addition to investigating disposal sites, his staff also assists the public on such subjects as lake sites, landslides, and sinkhole collapses.

The staff also is involved in several federally funded projects, such as an environmental impact study on shallow oil drillings in western Missouri, and a study on the effects of septic tanks on surface and ground water.

Williams, who became chief engineer in 1960, has been instrumental in writing several pieces of legislation, including bills on dam safety, hazardous waste regulations, and the definition of a geologist's duties. He has received national recognition with the Association of Engineering Geologist President's Award in 1979.

Williams said the employee of the year award came at a very good time—right in the middle of a controversy over a landfill at Macon. "It made me feel like someone appreciates what we do."



Resource Steward Awards

The Department of Natural Resources honored Missouri citizens, industries, and organizations who made special efforts to preserve and wisely use Missouri's resources for the first time in fiscal year 1982. Awards were presented to Lon Simmons, High Ridge, a solar-housing design contractor; Jim Crates, Rolla, a forester; the St. Charles County Soil and Water Conservation District; the city of Arnold; and Syntex Agribusiness Inc., Springfield. The five award recipients were honored at the 1981 Commissioners' Conference.

Department director Fred Lafser commented on the awards: "It was encouraging to me personally to stand back and consider all those throughout the state who, through their individual efforts, joined us in our effort to protect and wisely use Missouri's resources."

Lon Simmons, an English teacher turned energy conserver, was one of the award recipients. Simmons is the founder and president of Simmons and Sun, Inc., a consulting and contracting firm specializing in solar-powered, earth-sheltered housing. His successful contributions in energy-efficient solar construction led to his award.

A forester at Mark Twain National Forest, Jim Crates was honored for his personal efforts in developing the Ozark Trail. This hiking trail will stretch 350 miles—from the St. Louis metropolitan area to the Arkansas line—when it is completed.

Also honored was the St. Charles County Soil and Water Conservation District. This district was honored because of "its willingness and proven capability to speak out for the land," said Lafser. A major effort of this district

is preservation of prime food-producing areas in St. Charles County. District supervisors have recognized the need to protect these prime lands and taken the initiative in their protection.

The city of Arnold received recognition for its approach in minimizing the damage done by the overflowing Meramec River. Instead of building a levee to control the flooding, city officials chose to relocate residents and so became leaders in a national trend away from structural solutions to flooding problems.

The Department of Natural Resources also honored Syntex Agribusiness Inc.'s innovative cleanup of an inherited hazardous waste problem. This company is the first in the world to successfully degrade large amounts of the hazardous chemical dioxin by photochemical means.